REGULATING AUTOMOBILE POLLUTION: AN ENVIRONMENTAL SUCCESS STORY FOR DEMOCRACY?

CHRISTOPHER H. SCHROEDER*

I. TWO VIEWS OF THE RELATIONSHIP BETWEEN ENVIRONMENTAL POLICY AND POLITICS

For at least the past four decades, national environmental law and policy have been subjected to intense scrutiny, much of it producing withering criticism.[1] The criticisms have not been at all unified. Existing environmental law and programs are attacked by some because they are too strict, inflexible and expensive. At the same time, others attack those same laws and programs because they are inadequate, insufficiently bold and under enforced. Regardless of where a specific analysis comes out on such bottom line questions, both the too-tough and the too-lax schools have contributed two distinct types of critique to our environmental understanding. One type articulates and defends a substantive position with regard to what the content of our environmental policies ought to be. Here, the too-tough and the too-lax viewpoints can be as critical of the other as each is of existing policy; indeed, each regularly implies that existing policy is troubled largely because it has

* Charles S. Murphy Professor of Law and Professor of Public Policy Studies, Duke University. A.B., Princeton Univ., 1968; M.Div., Yale Univ. 1971; J.D. Univ. California at Berkeley (Boalt Hall), 1974. This essay is based upon a presentation given at "Ten Years After the Clean Air Act Amendment of 1990: Have We Cleared the Air?" at Saint Louis School of Law on November 17, 2000. My thanks to Doug Williams, Amy Hoch, and all the students at Saint Louis University School of Law who made this event a congenial and stimulating forum.

1. The end of the millennium, nearly coinciding with the thirtieth anniversary of Earth Day, produced a wealth of comprehensive reviews and analyzes of environmental law and policy, and many of these provide overviews of the major criticisms. *See, e.g.*, Richard B. Stewart, *A New Generation of Environmental Regulation?* 29 CAP. U. L. REV. 21, 27-38, plus sources cited in n.1 (2001). An excellent recent analysis of the shortcomings of the pollution control elements of environmental law and policy is J. CLARENCE DAVIES & JAN MAZUREK, POLLUTION CONTROL IN THE UNITED STATES: EVALUATING THE SYSTEM (1998). Comprehensive overviews of the deep ecology criticisms of current policies are harder to find than overviews of the economics-based criticisms. A useful examination of environmental ethics and some exploration of the policy prescriptions that flow from non-anthropocentric traditions is PETER S. WENZ, ENVIRONMENTAL ETHICS TODAY (2001). *See also* MARK SAGOFF, THE ECONOMY OF THE EARTH (1988).

been unduly influenced by the other. A second type of critique concentrates on the political processes that produce our environmental policies. Work in this second stream tends to show more commonalities than does the work in the first. Analysts who think policy is too tough often see the same deficiencies in the political system, as do analysts who think policy is too lax.

Contributors to the first stream, the *policy failure* stream, endorse some normative policy objectives and techniques and then argue that existing laws and regulations do a very poor job in achieving those objectives. The economic theory of environmental policy, for example, has produced numerous analyses articulating and defending a theory of optimal pollution and promoting market-based or incentive-based regulatory techniques.[2] The great majority of such analyses then identify particular aspects of existing laws and regulations that are unsatisfactory when judged against this theory. To say that the economic theory of environmental policy necessarily concludes that environmental programs are too strict, too expensive or too rigid would be a false over-simplification; some prominent environmental initiatives have benefited from economic analyses that found existing policies to be too lenient.[3] Most of the contemporary work in this genre fall into this category, however. Economic environmental theory is much more likely to be too-tough than too-lax.

Other philosophical and intellectual traditions produce work in the policy failure stream that faults environmental policy for not going far enough, nor being bold enough. Non-anthropocentric theories of rights and justice, for example, advocate greater protection for flora, fauna and ecosystems, which can lead to criticisms of the Endangered Species Act for its narrow focus on critical habitats and species on the brink of extinction, as opposed to broad ecosystem management.[4] Conservationists advocate commitment of greater

---

2. *See* Stewart, *supra* note 1, at 27-38.

3. Removing lead from gasoline, perhaps the single most outstanding success story in the control of auto emissions, was preceded by a cost-benefit analysis showing that the limitations on lead content then in effect did not go far enough. New research into the adverse health effects of airborne lead showed that the health costs of any lead in gasoline were well in excess of the performance and maintenance benefits from its continuing use. *See* Robert Percival, *Checks Without Balance: Executive Office Oversight of the Environmental Protection Agency*, 54 LAW & CONTEMP. PROBS. 127, 188 (1991). More generally, an analysis of twelve different regulatory cases at EPA found that in five of the cases studied, cost-benefit analysis provided support for regulations more stringent than originally proposed by EPA. *See* ECONOMIC ANALYSIS AT EPA: ASSESSING REGULATORY IMPACT (Richard D. Morgenstern ed., 1997) (the five cases were visibility protection for the Grand Canyon, emissions of organic chemicals, reformulated gasoline, lead in drinking water, and lead in gasoline).

4. *E.g.*, Michael J. Bean, *Taking Stock: The Endangered Species Act in the Eye of a Growing Storm*, 13 PUB. LAND L. REV. 77, 83-85 (1992); Holly Doremus, *Listing Decisions Under the Endangered Species Act: Why Better Science Isn't Always Better Policy*, 75 WASH. U. L.Q. 1029, 1132-1136 (1997).

acreage of roadless wilderness areas. Theorists of environmental justice find existing programs unresponsive to the distributive claims paramount to that theory.[5] Many deep ecologists promote a steady-state economy, or a Conserver Society, and on those grounds advocate numerous changes in life style, energy infrastructure, consumption patterns and the use of renewal resources, and find much American environmental policy to be indifferent to, or even to be incompatible with, most of these prescriptions.[6]

The diverse works in the policy failure literature thus reflect the rich array of normative perspectives that our culture and traditions bring to bear on questions of environmental policy. In one fundamental respect, however, they all share a common orientation. Each contribution to the policy failure literature argues from a normative ideal entirely outside the context of the political processes through which actual policy is developed, enacted and implemented, and each assesses actual programs currently on the books solely with regard to how those programs fall short of carrying out that normative ideal. This style of criticism has a long pedigree. However, insofar as such work is written with a view toward moving actual policies in the direction of its ideal, it suffers from a significant defect. By bracketing any analysis of the political processes through which proposals for policy change must proceed if they are to be realized, the policy failure literature implicitly relies upon the motivational force of good ideas alone to effectuate change. It was just this "idealistic view" that George Stigler castigated in 1971 when he wrote that "preach[ing] to the commissioners or to the people who appoint the commissioners" is useless as a method for reforming policy, because it ignores "the basic logic of political life."[7]

The second stream of critical environmental scholarship, the *political failure* stream, takes seriously Stigler's observation. Political failure criticism seeks to understand the motivations of political actors and the dynamics of political institutions so as to explain how the basic logic of political life produces our environmental policies. Although ostensibly concerned with explaining and criticizing process, much of the work in the political failure stream lacks a clearly articulated normative theory of politics as process.

---

5. *See, e.g.*, Sheila R. Foster, *Meeting the Environmental Justice Challenge: Evolving Norms in Environmental Decsionmaking*, 30 ENVTL. L. REP. 10992 (Nov. 2000); Sheila R. Foster, *Justice From the Ground Up: Distributive Inequities, Grassroots Resistance, and the Transformative Politics of the Environmental Justice Movement*, 86 CALIF. L. REV. 775 (1998); Eileen Gauna, *The Environmental Justice Misfit: Public Participation and the Paradigm Paradox*, 17 STAN. ENVTL. L.J. 3 (1998).

6. *See, e.g.*, ROBERT C. PAEHLKE, ENVIRONMENTALISM AND THE FUTURE OF PROGRESSIVE POLITICS (1989).

7. George Stigler, *The Theory of Economic Regulation*, 1 BELL J. OF ECON. & MANAGEMENT SCI. 1 (1971), *reprinted in* CHICAGO STUDIES IN POLITICAL ECONOMY 209, 225-226 (George Stigler ed., 1988).

Instead, the same substantive policy norms that establish the regulative ideals of the policy failure literature do so here. Political failure analysis then identifies explanations for why actual policy deviates from these policy ideals.

For example, the rational choice branch of political failure analysis grows out of the same economics tradition that produced the economic theory of optimal pollution, embracing the same policy goals and the same list of evident policy failures. These include faulting environmental policy for not basing pollution policy on cost-benefit analysis, for employing performance standards instead of financial incentives or market-based programs such as emissions trading as regulatory instruments, for mandating nationally uniform standards that fail to take into account local variations in both the costs and the benefits of controls, for regulating new sources of pollution more stringently than older sources, for failing to prioritize regulatory targets so that the worst are regulated first and for condoning wide discrepancies across regulatory programs in costs per unit of health or environmental benefit.[8] Rational choice theory develops a theory of the basic logic of political life, which purports to explain why these undesirable features of actual policy have come into being in lieu of the preferred policies.

For rational choice, the sources of these policy defects can often be found in the advantages concentrated economic interest groups have in organizing to gain political success as compared to diffuse groups of environmental consumers, be we breathers of clean air, drinkers of clean water, or people who enjoy wilderness or believe in the preservation of species.[9] Because they are better able to surmount collective action problems so as to offer reelection assets and services to politicians, the auto manufacturers, the steel industry, the makers of petrochemicals and pesticides, the electric power industry, the timber industry and similar others have more assets and services to trade with politicians in exchange for favorable policies. The discrepancy between the regulations of old versus new sources of environmental damage, for instance,

---

8. Stewart, *supra* note 1, at 27-38.

9. For a summary of the general rational choice presumption in favor of large concentrated interests, see Christopher H. Schroeder, *Rational Choice Versus Republican Moment Explanations for Environmental Laws, 1969-73*, 9 DUKE ENVTL. L. & POL'Y F. 29 (1998). *See also* Richard Revesz, *The Race to the Bottom and Federal Environmental Regulation, A Response to Critics*, 82 MINN. L. REV. 535, 542 (1997) ("The logic of collective action would suggest that the large number of citizen-breathers, each with a relatively small stake in the outcome of a particular standard-setting proceeding, will be overwhelmed in the political process by concentrated industrial interests with a large stake in the outcome.. . ."); Daniel A. Farber, *Politics and Procedure in Environmental Law*, 8 J.L. ECON. & ORG. 56, 60 (1992) (rational choice theory predicts "that environmental groups will not organize effectively and . . . environmental statutes will not be passed"). Of course, the most general prediction from rational choice—that environmental laws will not exist—has not been borne out by experience. Rational choice theory makes numerous more micro-level predictions, however, that are more consistent with the observed facts. *See* text accompanying note 12-14.

purportedly reflects the success of existing industry to raise costs of entry for potential rivals.[10] Other types of regulation, such as the Prevention of Significant Deterioration Regulations under the Clean Air Act, purportedly demonstrate the ability of the rustbelt states to negate the competitive advantage for attracting new industry that cleaner areas of the country might have if the costs of environmental controls reflected localized cost/benefit considerations.[11]

This interest group oriented rational choice explanation of political failure seems more plausible when applied to the details of environmental implementation, where it bears some kinship with earlier agency capture theories, than it does as a creation story.[12] Whereas the economic theory of optimal pollution finds many existing policies to be too strict, rational choice's commitment to the comparative advantage of concentrated economic interest groups over diffuse environmental interest groups predicts that environmental legislation will be lax or non-existent.[13] The history of enacting the original environmental legislation of the late 1960's and early 1970's cannot easily be made to fit such a model.[14] To explain those enactments, the idea of symbolic politics frequently comes into play.[15] Occasionally, the conviction that "something needs to be done" to address a particular social concern becomes politically salient enough to a sufficient segment of the voting public that

10. *See generally* Peter Huber, *The Old-New Division in Risk Regulation*, 69 VA. L. REV. 1025 (1983). More broadly, rational choice theorists have developed a political theory of regulation, which analyzes ways in which certain segments of industry might use regulations to create barriers to competition. For a review of the arguments, see Jonathan Baert Wiener, *On the Political Economy of Global Environmental Regulation*, 87 GEO. L.J. 749, 750 (1999); Todd Zywicki, *Environmental Externalities and Political Externalities: The Political Economy of Environmental Regulation and Reform*, 73 TUL. L. REV. 845 (1999); Michael T. Maloney & Robert E. McCormick, *A Positive Theory of Environmental Quality Regulation*, 25 J.L. & ECON. 99, 100 (1982); James M. Buchanan & Gordon Tullock, *Polluters' Profits and Political Response: Direct Controls Versus Taxes*, 65 AM. ECON. REV. 139 (1975).

11. *See, e.g.*, B. Peter Pashigian, *Environmental Regulation: Whose Self-Interests are Being Protected?* 23 ECON. INQUIRY 551 (1985).

12. *See* Wiener, *supra* note 10, at 750 ("[Rational choice] theory has difficulty explaining the origin of national environmental law: indeed, it suggests that diffuse environmental benefits and concentrated compliance costs will yield no environmental legislation. [It] does provide a more robust explanation of regulatory content, demonstrating that rent-seeking by concentrated interests can distort the hidden details of regulation.").

13. For a review of the theory of collective action as it has been applied to enacting the original wave of environmental legislation, see Schroeder, *Rational Choice vs. Republican Moment Explanations for Environmental Law*, *supra* note 9.

14. *Id.*

15. *E.g.*, John Dwyer, *The Pathology of Symbolic Legislation*, 17 ECOLOGY L.Q. 233 (1990). For a review of the role of symbolic politics, see Sara Sun Beale, *Federalizing Hate Crimes: Symbolic Politics, Expressive Law, or Tool for Criminal Law Enforcement?* 80 B.U. L. REV. 1227, 1247-1253 (2000). The locus classicus of this approach to political failure is the work of Murray Edelman. *See* MURRAY EDELMAN, THE SYMBOLIC USES OF POLITICS (1964).

politicians cannot avoid responding in some fashion. The general inattentiveness of the public to the actual workings of public policy, however, enables elected officials to placate the public by enacting laws that are symbolically and rhetorically tough, but ultimately ineffective, thereby placating public sentiment while not imposing any substantial costs on their most important interest group supporters.[16]

There are other strands within the rational choice literature, but these illustrate the two core conclusions of political failure analysis, which in one way or another exhaust the possibilities: either minority interests have too much influence on the outcomes, or majority interests do. The economic theories of environmental politics are not the only ones to reach such conclusions. A variety of non-economics based analyses lead to similar results. Within the deep ecology literature, majoritarian political failure has perhaps been a more frequent focus of attention compared to rational choice's emphasis on minority interest domination. The deep ecology critique of majority preferences isn't that they produce regulation that is too tough; rather, those preferences result in policies that are insufficiently transformative. Responsibility for such majority political failure is placed on the social, cultural and economic conditions that produce those preferences.[17]

A prominent example is William Ophuls' *Ecology and the Politics of Scarcity*, which argues that majoritarian democratic government will be unable to make the hard choices required to turn the path of human development away from a cataclysmic limits to growth crisis and toward conditions of sustainable development.[18] While green scholarship has long since shied away from Ophul's recommended solution—highly authoritarian government—much of that scholarship agrees with Ophuls insofar as it argues that politics as currently practiced will be unable to make the correct environmental choices and that it needs to undergo significant transformations in order to achieve sustainable development.[19] Driven by ever expanding demands for material and consumption goods and underwritten by a refusal to understand the limits

16. *See, e.g.*, Robert Glicksman & Christopher H. Schroeder, *EPA and the Courts: Twenty Years of Law and Politics*, 54 LAW & CONTEMP. PROB. 249, 292-95 (1990) (describing the combination of interest group and symbolic politics theories in environmental lawmaking). On the symbolic benefits of the 1970 CAAA, see Helen Ingram, *The Political Rationality of Innovation: The Clean Air Act Amendments of 1970*, *in* APPROACHES TO CONTROLLING AIR POLLUTION 20-23 (Ann F. Friedlaender ed., 1978).

17. This tendency within deep ecology was memorably encapsulated in Pogo's remark, "We have met the enemy and he is us." *See* Walt Kelly, *at* http://www.bpib.com/kelly.htm (last visited May 30, 2001).

18. WILLIAM OPHULS, ECOLOGY AND THE POLITICS OF SCARCITY (1977).

19. *See, e.g.*, ROBERT C. PAEHLKE, ENVIRONMENTALISM AND THE FUTURE OF PROGRESSIVE POLITICS (1989). *See also* DEMOCRACY AND GREEN POLITICAL THOUGHT (Brian Doherty & Marins de Geus eds., 1996) (collection of essays explaining the connections between democratic participation and deep ecology).

to growth, majoritarian politics will be unwilling and unable to make the decisions necessary to become the Conserver Society that is required for the long term well being of the planet and of humankind.[20]

Criticism of the excessive influence of concentrated economic interests is certainly not absent in the green political failure literature, as well. Such groups as Public Citizen and the Nader inspired PIRGs often seek to expose the disproportionate influence of organized interest groups by tracing the level of campaign contributions from various interests and using those contributions to explain the votes of elected officials.[21] This green minority failure analysis shares much in common with its rational choice interest-group dominance counterpart. Overall, the green literature has surveyed existing environmental policy and politics and found the picture of political failure to be as dismal as does the economics-inspired political failure scholarship.

As even this short and incomplete review shows, elements within the policy failure and the political failure streams flow from a diverse set of origins. The two streams also concentrate on quite different questions. The policy failure literature identifies the policies we ought to have and the political failure literature explains why politics prevents us from getting there. Notwithstanding their many differences, almost all the contributions to either literature are united by at least one shared view. Each views the relationship between policy and politics as one in which ideal policy has clear normative priority over politics. The policy failure literature often reads as if politics did not exist. The political failure literature takes normative policy success as the criteria against which to judge politics. First it identifies the policy ideal, next it concludes that actual policy fails to achieve the ideal, then it develops an explanation for the divergence in terms of minority or majority influence, either of which is treated as undesirable to the extent it deflects public policy from the ideal.[22] Throughout, policy and politics stand in relationship to one another as goal does to obstacle. The result is a decidedly dismal picture of our environmental policies as well of our prospects for improving them.

---

20. PAEHLKE, ENVIRONMENTALISM AND THE FUTURE OF PROGRESSIVE POLITICS, *supra* note 19, at 217-272 (describing deficiencies of current political attitudes and outlining the changes necessary for progressive environmentalism to succeed).

21. *See* Public Citizen's analysis of the relationship between gambling industry campaign contributions and Senate Majority Leader Trent Lott's "little-known legislative actions that protected the casino industry," *at* http://www.citizen.org/congress/reform/betting.htm (last visited May 25, 2001); the Stop the Rollback campaign of the state PIRGs, aimed at protecting environmental laws from being weakened by "powerful polluters," *at* http://www.stoptherollback.com/fact.html (last visited May 25, 2001).

22. *Compare* Einer Elhauge, *Does Interest Group Theory Justify More Intrusive Judicial Review?* 101 YALE. L.J. 31 (1991) (arguing that rational choice theory cannot judge whether an interest group has excessive influence until it adopts substantive norms for determining the correct policy outcome, after which the group that influences deviation from that outcome is said to have excessive influence).

Both a practical and a conceptual reservation need to be raised against this shared understanding and its most dreary implications. Practically speaking, the environmental facts are more positive than this picture suggests. Take the economic theory of optimal pollution. The policy failure viewpoint harshly criticizes policy that falls short of the goals of efficiency and cost-effectiveness. Holding policy to a standard of perfection, however, risks overlooking a good result in the search for the ideal. An alternative evaluation scheme would find positive value in policies that moved in constructive directions, whether or not they achieved perfection. Judged against such an alternative scheme, many of our environmental programs score well. While each of our environmental programs might be unable to satisfy a standard of being the most cost-effective means to any specific environmental objective, the vast majority of them have produced benefits that exceed their costs, thus satisfying a minimal cost-benefit test.[23] There is thus a good economic reason to conclude that we are better off for having them in place than we would have been without them.[24]

Likewise, many environmental programs defy standard forms of political failure analysis. Majoritarian influences have produced regulation that is far from symbolic, extracting significant environmental benefits from costly industry action. Private compliance costs for environmental regulations are estimated to be around $150 billion per year and growing,[25] and many of the costs are from programs that concentrated industry interests would not have chosen had they been in control of the process. Analyses based on inter-interest group and inter-sectional rivalries may be partially explanatory of some programmatic design and implementation decisions, but it is hard to believe that they are the sole explanations, and in some cases such as the regulation of automobile pollution, the relevant interest groups are heavily aligned against stringent regulation in nearly monolithic fashion, and yet regulation has still been stringent.

---

23. The difference between the policy failure stance and the alternative stance is one of emphasis. Sometimes both perspectives are at work in a single assessment. *E.g.*, J. CLARENCE DAVIES & JAN MAZUREK, POLLUTION CONTROL IN THE UNITED STATES: EVALUATING THE SYSTEM 148 (1998) ("When looked at as a whole, U.S. environmental progress has made economic sense. It can be shown that benefits exceed costs in a great number of cases. At the same time, it appears as if environmental gains have been achieved at unnecessarily high cost.").

24. For a summary of the positive results of our air and water programs, see MARY GRAHAM, THE MORNING AFTER EARTH DAY: PRACTICAL ENVIRONMENTAL POLITICS 6-7 (1999). For an even rosier recitation, see GREG EASTERBROOK, A MOMENT ON EARTH: THE COMING AGE OF ENVIRONMENTAL OPTIMISM (1995). For the perspective that Easterbrook's account is in places too rosy, see ENVIRONMENTAL DEFENSE FUND, A MOMENT OF TRUTH: CORRECTING THE SCIENTIFIC ERRORS IN GREGG EASTERBROOK'S A MOMENT ON THE EARTH (1995), *available at* http://www.ed.org/pubs/Reports/a_eastbrk.html (last visited May 25, 2001).

25. DAVIES & MAZUREK, *supra* note 23, at 123.

The conceptual reservation runs deeper. The structure of the relationship between policy and politics that is implicit in the policy and political failure literature does not withstand scrutiny. Carrying the logic of goal and obstacle to its limits, the implication is that environmental success could be satisfactorily achieved through the authoritarian imposition of environmental policies that were strongly opposed by the vast majority of Americans. Indeed, on this view, norms of democratic decision-making and popular assent ought to be sacrificed if that would enable achieving the policy ideal. The goal-and-obstacle structure, in other words, is a structure in which the role of democratic decision-making is entirely instrumental, to be judged entirely by the results it achieves. Because it always thwarts ideal policy, it is something to be maneuvered around.

This is the wrong way to think of the relationship of policy to politics, for several reasons. Precisely because authoritarian imposition of ideal policy is not an option for any social structure within which any of us would wish to live, some degree of public acceptability is an essential ingredient for sound public policy, not a flaw that amounts at most to a necessary evil. Short of massive funding of an environmental police force, furthermore, cooperation between public and private actors will form a key component of any successful environmental program, which provides an entirely pragmatic reason to ground public policy in the public acceptance that normally attaches—at least presumptively—to programs that have been enacted through democratic processes. Beyond such pragmatic considerations, democratic decision making practices reflect values independent of the instrumental consequences of the resulting policies. Because they ought to acknowledge that individuals are to be treated with equal dignity and respect, acts of government require public justification through processes that are fair and open to all. Democratic values are tragically foreshortened if politics is valued purely for the instrumental results that democracy produces.

For reasons such as these, the structure of the relationship between policy and politics cannot be that of goal and obstacle. It is better to think of it as a recipe. Sound policy requires both justification against some instrumentalist ideal and public justification and acceptability through adoption by democratic institutions, and it requires an adequate amount of each. Policy should not be slave to public passions or dominated by minority interests, but neither should it make the political processes through which policies are adopted lexically inferior to policy ideals. To meet this joint requisite, environmental policy must be justified in terms of policy results, and also must be publicly justified through adoption by public institutions employing satisfactory processes. The best environmental policy in terms of moving a democratic society toward a sustainable relationship between humankind and the biosphere is going to be one that will most likely not be perfect when judged against any policy ideal,

but it will nonetheless be the best policy insofar as it produces constructive, sustained and acceptable polices and programs.[26]

Crucial to any recipe view of policy and politics is the idea that policy needs both to move us adequately in a constructive direction, judged against some normative ideal, and that it needs to be emerge from political processes that are sufficiently acceptable to sustain democratic legitimacy. Currently, neither policy failure analysis nor political failure analysis possesses any cogent approach to assessing whether or not a given outcome or process is adequate, as opposed to ideal. Each focuses on distinguishing the perfect from the imperfect, not on developing a theory of the adequate. This essay cannot be the occasion to work out such a theory. It can, however, provide an illustration of how environmental policy might be evaluated when the goal and obstacle perspective is changed to a recipe perspective. The remainder of the essay will use the regulation of auto air emissions to illustrate some basic features of a recipe view of policy and politics.[27]

Two minimum conditions are necessary, but almost certainly not sufficient, for any policy to be evaluated favorably under a recipe approach to policy and politics. First, policy needs to do more good than harm in moving us toward a desirable objective. Second, policy must be broadly acceptable to a majority of the public, in some sense that I will not attempt to define further here. Viewed against these two minimum conditions, several features of our attempts to regulate air emissions from automobiles suggest that those efforts are candidates for favorable review under this approach, notwithstanding their many flaws. Auto emissions policy has followed the path of majoritarian

---

26. Compare the similar idea developed by Gerald Gaus in his theory of constitution building and the liberal demand that constitutional principles require public justification. "To serve its purposes," Gaus writes,

> a constitutional order must not only be justified, but must be widely perceived as such. . .As a moral agent, [one] must decide what arrangements are most conducive to honoring his commitment to justify himself; confronted with a choice between an ideal constitution and a less than ideal constitution that is widely embraced, [he] may rightly concur that the latter actually is more conducive to moralized social relations. To insist on what he believes to be right may lead to conflict, the breakdown of the political order, and a return to the state of anarchy in which moralized relations are not generally available. . . .[A] constitution that is less than perfect . . . may nevertheless be the best constitution from the perspective of actually leading a life informed by moralized relations.

GERALD F. GAUS, JUSTIFICATORY LIBERALISM 214 (1995).

27. Regulation of automobile air emissions can be, and usually is, subsumed under the broader category of mobile source emissions regulation, which includes as regulatory targets trucks, buses, trains and planes as well as automobiles, and diesel powered as well as gasoline powered engines. This essay concentrates on the automobile story, a story in itself sufficiently complicated as to allow reference only to its most significant features. For an excellent summary of the overall mobile source program, and more details on auto emissions regulation, see Arnold W. Reitze, Jr., *Mobile Source Air Pollution Control*, 6 ENVTL. LAWYER 309 (2000).

acceptability at crucial stages, leaning toward programmatic decisions that were relatively popular and away from those that were not. At those crucial moments, policy has not been dominated by minority influence. Under the goal and obstacle view, policy failed to make the right choices at those moments because the policies chosen fell short of the ideal. Despite having been less than perfect, however, auto air emissions regulations have proven constructive in achieving real emissions reductions in those emissions. Thus, those regulations meet the two minimum conditions for favorable evaluation by a recipe understanding of policy and politics.

A favorable evaluation can only be a provisional one, though, because we are at a point where auto emissions regulation needs to evolve further if it is to continue making progress. Increases in vehicle miles traveled (VMT) will negate gains we have made in reducing emissions per mile traveled through exhaust emissions standards, evaporative emissions controls and the regulation of fuel content. As those gains erode, the test of policy and politics will be whether additional steps can be enacted and implemented that take us to the next level of emissions reduction. If we make a successful transition to yet more reductions of auto emissions through acceptable policy initiatives, it stands to reason that one factor in that success will have been the thirty plus years which we have already spent exploring alternatives and establishing a solid public awareness of the need for controls. At this point, the jury is still out. Nonetheless, the recipe perspective on policy and politics would not condemn the choices we have made so far. Auto emissions policy to date as has the potential to end as a success story rather than a failure.

II. POLICY AND POLITICS IN REGULATING AUTO AIR EMISSIONS

A. The Nature of the Problem

Exhaust emissions from automobiles and other mobile sources have long been known to be major sources of air pollution, and writing federal regulations for them was a major feature of the Clean Air Act Amendments of 1970 (1970 CAAA).[28] As a result of those regulations and further rules established under the 1990 Amendments, automobiles coming off the assembly line are now capable of emitting 70 - 90% less of the criteria pollutants per vehicle miles traveled than they did in 1970, and their emission of lead has been reduced to zero as a result of removing lead from gasoline.

Still, the contribution of automobile emissions to the nation's total loading of air pollutants remains considerable. Of the six criteria air pollutants, auto emissions account for three-quarters of the national total for carbon monoxide (CO), one half of the total for oxides of nitrogen (NO_x), and forty percent of

28. *See* text accompanying notes 39 - 42.

the total for volatile organic compounds.[29] These shares have remained relatively stable throughout the thirty-year period since passage of the 1970 CAAA.[30] Automobiles are also significant contributors to atmospheric loadings of the remaining two criteria pollutants, particulate matter and sulphur dioxide. Hazardous air pollutants (HAPs) are emitted from automobiles at rates amounting to about 20% of the national HAP total.[31] Finally, autos produce appreciable amounts of greenhouse gases, as well, contributing 32% of the nation's carbon dioxide emissions in 1998.[32] The elimination of lead from gasoline has been the outstanding success story of auto emissions control, dropping mobile source contribution to total airborne lead from 80% in 1970 to 13% in 1997, and dropping the overall total to just 1/20th of what it was in 1970.[33]

The continuing major role played by mobile sources in many aspects of air quality is attributable to several causes.[34] Actual performance of the automobile fleet does not achieve all the emissions reductions of which cars are technologically capable because EPA bases certification of new vehicles on tests that do not accurately reflect real driving conditions. The performance of emission control equipment also deteriorates in use, and existing inspection and maintenance programs are inadequate to ensure that malfunctions are quickly corrected or deliberate tampering quickly identified. Even if these contributors were eliminated, however, the "most serious danger to the success of mobile source controls programs [is] the continued upswing in auto usage."[35]

B. The Policy Options

The problem of auto air emissions is but an instance of a wide category of pollution problems associated with the production of material goods or the conversion of matter into energy. In all such cases, the process or activity generating the pollution can be schematized as consisting of three basic components: (1) raw materials are supplied as input to the process, (2) the process itself then modifies or combines these materials, (3) thereby creating

---

29. *See* Reitze, *supra* note 27, at 314-315 and sources cited.

30. *See* Figure 5.3 in ROBERT PERCIVAL ET AL., ENVIRONMENTAL REGULATION: LAW, SCIENCE & POLICY 543 (3d ed. 2000) (comparing relative shares of criteria pollutants attributable to major pollution sectors in 1970 to 1997).

31. Reitze, *supra* note 27, at 315.

32. *Id.*

33. *Id.* Lead is also the sole criteria pollutant to experience an enormous reduction in total emissions, from about 220,000 tons in 1970 to a little less than 4,000 tons in 1998. So in 1998, mobile sources contribute a smaller percentage to a much smaller total than they did in 1970.

34. This paragraph summarizes points made by Craig Oren, in Craig Oren, *Getting Commuters Out of Their Cars*, 17 STAN. ENVTL. L.J. 141, 157-174 (1998).

35. *Id.* at 160. *See* text accompanying notes 77-79.

the final product or output plus pollution as a by-product. Complete analysis of the pollution control problem associated with such processes then requires consideration of a fourth component: (4) the frequency with which goods or services are produced. Reducing the adverse health and environmental effects of the pollution from such a process must necessarily rely upon changing one or more of these four components. There are just these four possibilities:

- Pollution Capture: Trap the pollution after it has been produced but before it has entered the environment.
- Input Change: Change the raw materials going into the process to ones that result in less harmful pollution.
- Process Change: Make changes in the process so that it accomplishes the same end function while generating less harmful pollution.
- Frequency Reduction: Reduce the frequency with which the polluting process operates.

In the course of approximately thirty-one years of regulating auto emissions,[36] federal policy has in one way or another tried each of these four techniques.

The brisk review of the history of that policy in the following section of this essay shows how policy and politics have regularly interacted so that at many significant decision points, the regulatory process has tended to shy away from options perceived to be politically unpopular and toward those that were more popular. The resulting mix of policies has emphasized pollution capture and input changes because these can be implemented in ways that target large corporations, and in which regulatory costs borne by automobile drivers and users are not immediately visible on a day to day basis. It has also de-emphasized directly imposing process change or frequency reduction, each of which is for differing reasons politically unpopular. Frequency reduction programs strike at the heart of American's preferences for individual convenience and flexibility. Imposing process change runs counter to the American sense that as between government and business, business has great advantages in entrepreneurial innovation, and that it is just such innovation that needs to be tapped in order to produce the technological improvements crucial to solving environmental problems.[37] Government should set the goals and

36. This essay begins its account of auto emissions policy with the enactment of the Clean Air Act Amendments of 1970, Pub. L. No. 91-604, 84 Stat. 1676 (Dec. 31, 1970) [hereinafter 1970 CAAA]. For the earlier history, see FRANK GRAD ET AL., THE AUTOMOBILE AND THE REGULATION OF ITS IMPACT ON THE ENVIRONMENT (1974); JAMES F. KRIER & EDMUND URSIN, POLLUTION AND POLICY: A CASE ESSAY ON CALIFORNIA AND FEDERAL EXPERIENCE WITH MOTOR VEHICLE AIR POLLUTION 1940 - 1975 (1977).

37. One of the clearest instances of this general aversion is the Resource Conservation and Recovery Act, which impose strict regulations on the handling of hazardous wastes after they are produced, but which avoids regulating the production of those wastes. "[R]ather than place restrictions on the generation of hazardous waste, which in many instances would amount to interference with the production process itself, the committee has limited the responsibility of the

protect against externalities, but it should not pick technological winners and losers. Aided by these supporting values, industry has successfully resisted most proposals to mandate process changes,[38] while losing many battles with respect to costly pollution capture measures. Together, these preferences and values help explain why policy has shied away from direct process change mandates and frequency reduction programs.

C. Highlights of Our Efforts to Reduce the Harmful Effects of Auto Emissions

The single most debated provision of the precedent-breaking 1970 CAAA, in both the chambers of the Congress and in the media, was Congress' mandate of a ninety percent reduction in hydrocarbon and carbon monoxide emissions from automobiles by the 1975 model year, as well as a similarly ambitious reduction in emissions of nitrogen oxides by the 1976 model year.[39] Congress established these goals after estimating what contribution the reduction of auto emissions would have to make to achieve an overall objective of attaining air quality levels protective of public health and welfare.[40] In reasoning backward from a public health objective in this way, the 90th Congress self-consciously "abandon[ed] the old assumption of requiring the use of only whatever technology is already proven and of permitting pollution to continue when it is not economically feasible to control it."[41] Congress had become frustrated with the old way of doing things because over the course of the 1950's and

---

generator for hazardous waste to one of providing information." H.R. REP. NO. 94-1491, 94th Cong. 26 (1976). *See also* American Mining Cong. v. EPA, 824 F.2d 1177, 1185-1186 (D.C. Cir. 1987) (construing RCRA's jurisdiction as limited to materials that have exited from "the industry's ongoing production process").

38. The general political aversion to imposing direct process changes does not guarantee that legislation will never intrude on production process decisions. After twenty years of small progress in controlling HAPs, for example, in 1990 Congress revised the HAPs provision of the CAA in such a way as to authorize EPA to set HAP standards based on what is achievable through "application of measures, processes, methods, systems or techniques including, but not limited to . . . process changes, substitution of materials or other modifications." 42 U.S.C. § 7412(d)(2) (2001). Should EPA base a HAP standard on process modifications, the resulting standards would not legally compel industry to adopt the process modifications identified by EPA as the basis for that HAP standard—it would only compel plant performance equal to what EPA determines could be achieved by doing so—but practically speaking it would have that effect.

39. CAA Amendments of 1970, Pub. L. No. 91-604, § 6(a), 84 Stat. at 1690 (1970) (codified as amended at 42 U.S.C. § 7521(b)(1)(A)-(B) (2001)).

40. The estimates were based on analyses performed by the National Air Pollution Control Administration, a subunit of the Department of Health, Education and Welfare, which was later incorporated into the Environmental Protection Agency. For the history of their derivation, see GRAD, *supra* note 36, at 33-36.

41. Senate Debate on S. 4358, 116 CONG. REC. § 32919 (Sept. 21, 1970) (statement of Senator John Sherman Cooper (R-KY)), *reprinted in* SENATE COMM. ON PUBLIC WORKS, 93 Cong. 1, *Legislative History of the Clean Air Act Amendments* of 1970, at 262 (Serial No. 93-18, 1974) [hereinafter *1970 Leg. History*].

1960's the State of California and the federal government had regularly engaged the automobile industry in conversations about the ability of that industry to abate emissions to satisfactory levels, only to be met as regularly by the response that this was a tough problem needing more research. A solution would take a few years longer.[42]

The auto emissions rollback provision passed squarely in the face of the auto industry's insistence that such ambitious targets could not be met. There can be little doubt that the auto industry vigorously opposed the 1970 tailpipe mandate,[43] and hence little doubt that its passage constitutes an instance in which the presumptive rational choice advantages of such concentrated economic interests were defeated by a broad public health goal.

The tailpipe mandate was also not a piece of symbolic legislation designed to gull the public into believing that their government had put a strong arm on industry, whereas the reality would turn out to be a failure of enforcement. To the contrary, at the time of its conception, this and other technology-forcing provisions of the 1970 CAAA were thought by the Congress to be rational and appropriate means to change the incentive structure facing industry. Over the course of the preceding fifteen years Congress had dealt with the auto industry and others on the basis of standards determined by what was technologically feasible, it had become aware that such regulations set up a perverse incentive for industry to slow walk through the development of innovative pollution reduction techniques, because success in innovation would only raise the worry that the next round of regulations would rachet down restrictions on emissions still further. In the 1970 CAAA, Congress switched the incentives by setting an ambitious goal and then threatening sanctions for failure to meet it. In this way, Congress sought to provide the industry with self-interested reasons to "stretch[] the [technological] possibilities . . . to find ways to do things that we are told in many, many instances cannot be done."[44]

As further evidence that Congress was trying to craft an effective program rather than engaging in symbolic posturing, the record shows that when Congress enacted the mandate, it explicitly acknowledged that the automobile industry might not be able to meet the ambitious goals it was setting.[45] Congress was not thereby enacting a law that would penalize firms for being

42. LAWRENCE J. WHITE, THE REGULATION OF AIR POLLUTANT EMISSIONS FROM MOTOR VEHICLES 12 (1982).

43. *See* CHARLES O. JONES, CLEAN AIR: THE POLICIES AND POLITICS OF POLLUTION CONTROL 195-198 (1975).

44. EXECUTIVE SESSION OF THE SENATE COMMITTEE ON PUBLIC WORKS, 91st Cong. 114-15 (Aug. 31, 1970) (remarks of Senator Muskie), Edmund S. Muskie Archives, Bates College, Lewiston, Maine, Folder SE 3041-4.

45. For a contrary view of the 1970 CAAA, see Ingram, *supra* note 16, at 22. ("The characteristics of the air pollution issue in 1970 foreordained a policy-making process that concentrated on setting high goals without giving much attention to efficient implementation.").

unable to do the impossible, nor was it irrationally proposing to shut down a major segment of the U.S. economy.[46] To the contrary, Congress anticipated the possibility that the industry might return to them in several years seeking an extension, and it was assuming responsibility for revisiting its decision in subsequent years. Under Congress' plan, however, such reconsideration would only come after industry had engaged in several years of effort to meet the mandate, so that Congress would have both the benefit of the additional industry experience upon which to base subsequent deliberations, and the ability to assess the seriousness of the industry's attempts.[47] As Senator Muskie said to his colleagues on the Senate floor, "Congress, I assume, will be in session in 1971, 1972, 1973, 1974 and 1975 . . . The companies would be in a position to make their case. If the Congress, which would have made the policy in the first instance, is persuaded that the industry cannot do the job, Congress could change the policy."[48] Asking for the problem to be brought back to the Congress for adjustments if it was not working was hardly a strategy for fooling the public with symbolic but empty rhetoric.

As it turned out, Congress was indeed in session in 1974, when it postponed the goals for one model year.[49] EPA granted an additional extension in 1975[50] and Congress followed suit once more in 1977.[51] These extensions elongated the compliance period, but they did not entirely remove the pressure on the industry to find solutions to technical problems. Congress was able to set lower standards for model years 1980 and 1981,[52] and the 1990 Amendments lowered them still further.[53] Pursuant to study provisions contained in the 1990 Amendments, the EPA has recommended further

46. The 1970 CAAA provided for a $10,000 fine for each automobile sold without a certification that that car type met federal emissions standards.

47. Congress also built into the 1970 CAAA ability for the Administrator of the EPA to grant a one-year extension on the deadlines, if certain statutory conditions were met. Upon a petition for such an extension, the Administrator declined to grant it—further evidence of the lack of interest group capture of the regulatory process. The industry did persuade the D.C. Circuit to reverse the Administrator's decision. Int'l Harvester v. Ruckelshaus, 478 F.2d 615 (D.C. Cir. 1973).

48. Senate Debate on S. 4358, 116 Cong. Rec. 32905 (Sept. 21, 1970) (remarks of Senator Muskie), *reprinted in 1970 Leg. History*, *supra* note 41, at 236.

49. The Energy Supply and Environmental Coordination Act, Pub. L. No. 93-319, 88 Stat. 246 (1974), *reprinted in* 1974 U.S.C.C.A.N. 3281, 3298.

50. Chrysler Corp., Ford Motor Co., and General Motors Corp., Applications for Suspension of 1977 Motor Vehicle Exhaust Emissions Standards; Decision of Administrator, 40 Fed. Reg. 11,900 (1975).

51. Pub. L. No. 95-95, §§ 201, 202(b), 91 Stat. 685, 751-52.

52. *Id.*

53. 42 U.S.C. § 7521 (g).

tightening of the exhaust emissions standards as so-called Tier II measures.[54] The 1990 Amendments also contain provisions tightening controls on evaporative losses, which result from vapor leakages around the various components of the fuel system, as well as from refueling itself.

One of the perplexities of retrospective policy analysis is that one can seldom be totally confident about what would have happened had a regulation not been put into place, so that one can seldom determine conclusively the net impact of that regulation. In the case of the auto emissions mandate, it is possible that the auto industry would have solved the technical problems associated with the catalytic converter just as quickly as they did once the mandate of the 1970 CAAA was put in place.[55] Evidence from early studies of the effects of the standards argues decidedly against that possibility, however.[56] Early statistical analyses attribute considerable explanatory power to the legislative standards for reducing levels of auto emissions.[57] The mandate thus did not amount to an "aspirational" command that produced very little by way of additional progress.[58] Even if the industry could be confident that EPA and Congress would not actually shut the industry down, mere "cosmetic efforts industry felt compelled to make in order to establish its good faith could not, given the resourcefulness of its engineers, but have produced some improvement."[59]

The 1970 emissions reduction mandate was a tough, calculated effort to incentivize the auto industry to lower auto emissions, and as such a substantial

---

54. U.S. EPA, Control of Air Pollution From New Motor Vehicles: Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control Requirements 65 Fed. Reg. 6698 (Feb. 10, 2000).

55. As it was, the subsequent extensions of the 1975/76 deadlines may be taken as some vindication of the Nixon administration's initial proposal for a 1980 deadline. In the context of the political struggle between President Nixon and Senator Muskie for the environmental vote, the Senate's cutting the deadline in half had political implications in addition to whatever the public health consequences of first imposing and then relaxing a tight standard might have been. The political dynamics of 1969-70 and how they may have affected environmental legislation are explored in Elliott, Ackerman & Millian, *Toward a Theory of Statutory Evolution*, 1 J.L. ECON. & ORG. 313 (1985).

56. *E.g.*, ROBERT CRANDALL ET AL., REGULATING THE AUTOMOBILE 92 (1986) ("There is little evidence to support the view that emissions rates would have fallen significantly without the emissions standards program.").

57. LAWRENCE J. WHITE, THE REGULATION OF AIR POLLUTANT EMISSIONS FROM MOTOR VEHICLES 47 (1981). In addition, the higher emissions standards being observed in other developed countries, such as Canada and the Western European countries, without mandatory standards lends further support to the conclusion that the standards had real effects. *See* CRANDALL, *supra* note 56, at 93.

58. The classic critique of so-called aspirational statutes—ones that sound nice but cannot possibly be met—is Henderson & Pearson, *Implementing Federal Environmental Policies: The Limits of "Spirational Commands*, 78 COLUM. L. REV. (1978).

59. *See* DAVID CURRIE, AIR POLLUTION: FEDERAL LAW AND ANALYSIS 2-114 (1981).

defeat for the automobile manufacturers. From an elected official's perspective, it was also a wonderful conjunction of a promising regulatory strategy and political popularity. In the years immediately preceding passage of the 1970 CAAA, the auto industry had badly damaged its public image as the result of two separate incidents. First, General Motor's representatives had confessed publicly before the Congress that it had hired a private investigator to snoop into the private life of Ralph Nader after publication of his broadside against the auto industry, *Unsafe At Any Speed.*[60] Second, the Justice Department had sued the auto industry for collusion in suppressing the development of control technology, leading to a consent decree that prohibited joint activities regarding pollution control.[61] As a result, the public was well primed to believe that the automobile industry was not to be trusted when it denounced sharper emissions reductions as impossible to achieve, that the industry was in fact capable of doing more and doing better, and that tough government insistence on industry action was an appropriate way to deal with their recalcitrance.[62]

At the same time as the mandate was a politically attractive regulatory option, further legal directives aimed at maximizing the effectiveness of that mandate were not. Pollution control equipment deteriorates in use, so that passing a controlled emissions test with vehicles fresh out of the factory cannot certify that those vehicles will continue to emit no more than allowable emissions once they are on the road. Testing and estimates by EPA in 1982

---

60. RALPH NADER, UNSAFE AT ANY SPEED: THE DESIGNED-IN-DANGERS OF THE AMERICAN AUTOMOBILE (1965).

61. United States v. Automobile Mfrs. Ass'n, 199 Trade Cas. ¶ 72902 (C.D. Cal. 1969); Goldstein & Howard, *Antitrust Law and the Control of Auto Pollution, Rethinking the Alliance Between Competition and Technical Progress*, 10 ENVTL. L. 517 (1980).

62.

> The political climate that ultimately precipitated the stringent emissions standards began to develop in 1965, when Ralph Nader published his famous indictment of the industry and was treated to a personal investigation at the industry's expense. Seldom has an attempt at intimidation backfired so spectacularly. The Nader affair led to a dramatic set of hearings in which the president of General Motors was forced to apologize to Nader in front of a congressional committee and a national television audience. Serious and lingering damage was done to the political credibility of the automobile manufacturers—damage soon compounded by allegations concerning their handling of the air pollution problem itself. . . .[Los Angeles County] supervisors charged that [a joint auto industry committee set up to conduct pollution control research] was in fact a collusive arrangement to prevent the introduction of controls. As evidence that industry developments were being suppressed rather than propagated, they cited the package of control devices developed by Chrysler but kept off the market until California legislation forced its introduction. . . . This incident unquestionably added to the public's impression of recalcitrance and bad faith on the part of the industry.

Henry D. Jacoby & John D. Steinbruner, *The Context of Current Policy Discussion, in* CLEARING THE AIR 10-11 (Henry D. Jacoby et al. eds., 1973).

indicated that total actual emissions from autos on the road ranged from 5% (for NO_x) to 76% (for CO) higher than they would be if actual performance matched the statutory emissions requirements.[63] In 1993 model year studies, the comparable figures were between 50% and 400%.[64] Programs of inspection and maintenance (I & M) can markedly reduce this discrepancy, by ensuring that the pollution control equipment installed on automobiles remains in good repair. Normal wear and tear is not the only obstacle to achieving actual reductions commensurate with the statutory standards. Late 1970's studies by EPA suggested that auto owners tampered with nearly 20% of new automobiles to disable their emissions equipment in order to achieve better performance.[65] Such tampering can also be minimized through I & M requirements.

Despite their evident ability to reduce emissions, I & M programs have foundered throughout the history of the CAA.[66] They have encountered resistance partly because the technologies for performing the inspections are themselves far from perfect, so that there has been some skepticism about their actual ability to produce air quality improvements.[67] At the same time, the onus of justifying these programs imposes a heavy burden on EPA and the states because the programs are so inconvenient and time consuming for the driving public that neither the federal government nor the states are eager to be identified as the one imposing highly objectionable programs on the driving public.

In addition to emissions control mandates, from its very inception United States auto emissions policy has also included the regulation of fuel content. The most dramatically effective single measure in our entire auto emissions policy has been the removal of lead from gasoline.[68] Under the 1970 CAAA, unleaded gasoline was required to be made available to fuel new vehicles,

---

63. CRANDALL ET AL., *supra* note 56, at 94-95.

64. Oren, *supra* note 34 at 158. Some of this discrepancy is attributable to the inability of the standard federal testing protocol for autos to match actual driving conditions, under which motorists experience circumstances such as sharp accelerations, which drive up actual emissions. *Id.*

65. LAWRENCE J. WHITE, THE REGULATION OF AIR POLLUTANT EMISSIONS FROM MOTOR VEHICLES 70 (1981).

66. *See* PERCIVAL ET AL., *supra* note 30, at 619-620 (a brief summary of problems with I & M programs); *see also* Todd A. Stewart, *E-Check: A Dirty Word in Ohio's Clean Air Debate—Ohio's Battle Over Automobile Emissions Testing*, 29 CAP. U. L. REV. 265 (2001) (detailing one state's problems with its I & M efforts).

67. *See* WILLIAM H. RODGERS, JR., ENVIRONMENTAL LAW: AIR AND WATER §3.29 n.42, and sources cited (Pocket Part, 2000) (complaints about the effectiveness of testing leads to resistance to implementing I & M programs).

68. For a more complete review of the interesting history of the elimination of lead from gasoline, see Thomas McGarity, *Radical Technology-Forcing in Environmental Regulation*, 27 LOY. L.A. L. REV. 943, 947-952 (1994).

because the lead in gasoline destroys the catalysts in the catalytic converters that became the technology of choice for meeting the exhaust mandates.[69] Lead came under further scrutiny due to its adverse health effects. Operating under a provision of the CAA that permitted regulation of gasoline additives that "will endanger the public health or welfare," in 1973 the Administrator ordered a reduction in the lead content in all gasolines.[70] That decision ultimately was sustained by the D.C. Circuit in *Ethyl Corp. v. EPA*,[71] one of the landmark cases ratifying the precautionary nature of modern environmental legislation. Subsequently, continuing problems with misfueling and additional research into the adverse health effects of lead prompted the Congress to order the complete removal of lead when the Air Act was amended in 1990.[72]

Over the years, we have learned more about how the composition of gasoline can be tweaked to achieve emissions reductions. The 1990 Amendments called for the use of reformulated gasoline (RFG) in areas that remained significantly in non-attainment for ozone. Currently, the RFG requirement applies on a mandatory basis to nine metropolitan areas, with other areas able to elect its use as part of an overall air quality maintenance strategy. The mandatory areas alone encompass 22% of all the gasoline sold in the United States, and the reformulated product produces 15% fewer hydrocarbon emissions than normal gasoline—plus reducing HAPs emissions, as well.[73]

New requirements in both pollution capture and fuel content have been developed throughout the history of auto air emissions control, and are continuing still. EPA as announced the so-called Tier II emissions standards, with will lower NO_x from the current 0.4 gpm to 0.07 gpm. It also proposes gradually to bring light-duty trucks and SUVs into compliance with roughly the same tailpipe standards as apply to autos.[74] EPA has also successfully brokered development of a national low emissions vehicle (NLEV) program under which automobile manufacturers will market nationwide vehicles

69. 42 U.S.C. § 7545 (2001).

70. 38 Fed. Reg. 33, 734 (1973).

71. 541 F.2d 1 (D.C. Cir.) (*en banc*), *cert denied*, 426 U.S. 941 (1976)

72. 42 U.S.C. § 7545(n) (2001).

73. PERCIVAL ET AL., *supra* note 30, at 612-13.

74. U.S. EPA, Control of Air Pollution From New Motor Vehicles: Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control Requirements, 65 Fed. Reg. 6698 (Feb. 10, 2000). Pollution capture regulations now also encompass on board computer diagnostic systems (OBD) designed to signal motorists when evaporative emissions or exhaust emissions standards have been exceeded, and to facilitate proper maintenance by making diagnostic information available to mechanics.

meeting California's LEV emissions standards.[75] As to fuel content, EPA has announced rules reducing the sulphur content of gasoline.[76]

The accomplishments of these measures have been considerable. For some time, however, policy makers have recognized that such success alone will not be sufficient to continue to make truly substantial reductions in the emissions from automobiles. Total atmospheric loading from autos depends upon the frequency with which autos are used and upon the processes autos use to convert matter to energy as much as it does upon the inputs used and the manner in which outputs are captured.[77] Without measures taken to alter these first two factors, increased auto use threatens to swamp tailpipe and fuel content standards. To illustrate, EPA has estimated that by year 2015, total vehicle miles traveled (VMT) by autos in the United States will have increased nearly four fold since 1970, and this increase will have the effect of reversing the slope of the annual hydrocarbons emissions curve from decreasing to increasing.[78] The combination of increasing population, increased VMT per capita, and extremely low occupancy rates has proven to be a devastating combination counteracting emissions gains made elsewhere.[79]

The 1970 CAAA contemplated a role for frequency reduction, in the form of transportation control measures (TCMs), as part of an overall air quality management strategy for automobiles. In this instance, the contemplation was much more symbolic than actual. Over the years, frequency reduction plans have proven to be the third rail of air pollution policy. EPA itself received one of the first shocks when it responded to the failure of the Los Angeles air basin to submit an implementation plan that would meet the original statutory compliance dates. Obligated by statute to fill in the resulting regulatory gap, in 1975 EPA proposed a federal implementation plan (FIP) that utilized drastic gasoline rationing measures among its strategies to reduce vehicle miles traveled sufficiently to meet the attainment deadlines.[80] The move proved so unpopular that Congress shortly stripped the EPA of the authority to include TCMs as part of a FIP.[81]

---

75. U.S. EPA, Control of Air Pollution From New Motor Vehicles and New Motor Vehicle Engines: State Commitments to National Low Emission Vehicle Program, 63 Fed. Reg. 926 (Jan. 7, 1998).

76. 65 Fed. Reg. 6698.

77. *Id.*

78. U.S. EPA website, *at* http://www.epa.gov/oms/04-ozone.htm.

79. While VMT have gone up, occupancy rates have actually declined, exacerbating the problem of vehicle use. Vehicle occupancy dropped from 1.3 passengers per trip to and from work in 1977 to 1.1 in 1990. Oren, *supra* note 34, at 163 (citing Federal Highway Administration statistics).

80. *See* PERCIVAL ET AL., *supra* note 30, at 619 (recounting history of Los Angeles FIP).

81. 42 U.S.C. § 7410(c).

Historically, while states have always retained authority to include more aggressive TCMs in their implementation, measures that have been attempted, such as car pool lanes, car free downtown areas, restrictions on parking, and other such have had negligible impacts on auto use and have consequently contributed insignificantly to the overall improvement in air quality.

When Congress wrote the 1990 Amendments, it enacted a new variant to such measures, one that focused its attention on large employers and only obliquely regulated individual car users. The 1990 trip reduction program directed major employers in the same non attainment metropolitan areas as are covered by the RFG requirement to create programs and revise company policies so as to achieve reductions in solo employee computes during rush hour, or to shift such trips out of the rush hours.[82] Implementation planning for the trip reduction program proved disastrous and highly unpopular, and Congress repealed the measure before the trip reduction plans were to go into effect.[83] The trip reduction program may well have been a flawed policy from its inception.[84] Even so, its huge unpopularity was more a product of the fact that "the ability of employers to persuade employees to reach work other than by driving alone is limited by the unattractiveness of the alternatives,"[85] than of any influential cost-effectiveness critique. In the short term, TCMs are unlikely to play any substantial role in emissions reduction policy precisely because they are so unattractive to the motoring public.

In fact, the federal governments overall policy toward frequency of automobile use has actually undermined air quality improvement goals. Federal emissions control programs have attempted to reduce auto emissions primarily through pollution capture and input change efforts. After thirty years of development, these are now experiencing diminishing returns. At the same time, other federal policies have been making reliance on the automobile even more attractive compared to the alternatives, and hence politically even harder to change. Those other policies do not come from any environmental statute, but rather from the role of the federal government in developing and maintaining our national highway system. They have had the effect of encouraging the use of highways, and to increase VMT, both indirectly and directly. First, the federal government is a major funder of highway construction and maintenance. Both in the current transportation bill, TEA-

82. Pub. L. No. 101-549, § 103, 104 Stat. 2399, 2438 (1990) (enacting § 182(d) of the Clean Air Act, 42 U.S.C. § 7511a(d) (1994)) (repealed 1995).

83. The details of the trip reduction program and its demises have been exhaustively studied by Craig Oren. *See* Oren, *supra* note 34. *See also* Craig Oren, *The Mandate From Hell: How the Trip Reduction Program Came Into Being*, 17 VA. ENVTL. L.J. 123 (1998).

84. This is Craig Oren's conclusion. *See supra* note 83.

85. Oren, *supra* note 34, at 222.

21,[86] as well as its immediate predecessor, ISTEA,[87] the federal government allocates approximately forty billion dollars a year to transportation, all but a minuscule amount of which goes to new construction, maintenance and repair.[88]

By improving the conditions of our highways, federal policy lowers the costs of using them, and thus encourages their use. Beyond this direct effect on VMT, however, transportation policy also has the effect of facilitating the phenomenon of urban sprawl, thus stimulating conditioned reliance on the automobile by increasing the costs of alternatives. Urban sprawl facilitates the dispersal of population centers as well as employment centers. Whereas well-defined residential areas combined with few and well-defined central business districts create conditions conducive to successful and efficient mass transit, decentralized population and employment centers make mass transit convenient and economical enough to compete with the automobile as an attractive alternative practically impossible.[89] Highway policy attests dramatically to the influence that Americans' love affair with their automobiles has had on air pollution. The politically attractive choices made in this area have contributed more to the air pollution problem than they have as of yet to its solution.[90]

Our policies toward process change in the auto emissions area have been more mixed than those toward frequency reduction. Consistent with the country's aversion to direct government designation of acceptable technologies, federal policy has not sought to direct the industry to build substitutes to the internal combustion engine (ICE). In 1969, Senator Gaylord Nelson had introduced a bill to abolish the ICE, but the greatest pay off from that proposal through Senator Muskie's use of it to persuade some of his

86. The Transportation Equity Act for the 21st Century, Pub. L. No. 105-178, 112 Stat. 107 (1998) (codified as amended in scattered sections of 23, 49 U.S.C.A. (West Supp. 1999)).

87. Intermodal Surface Transportation Efficiency Act of 1991, Pub. L. No. 102-240, 105 Stat. 1914 (codified as amended in scattered sections of 49 U.S.C. (1994 & Supp. IV 1998)).

88. *See* Federal Highway Administration at http://www.fhwa.dot.gov/tea21/funding.htm. On the transportation legislation and its environmental impacts, see Liam A. McCann, *TEA-21: Paving Over Efforts To Stem Urban Sprawl, and Reduce America's Dependence on the Automobile*, 23 WM. & MARY ENVTL. L. & POL'Y REV. 857 (1999).

89. *See* McCann, *supra* note 88.

90. The explanations for increased VMT are complex, encompassing cultural, demographic and economic changes that contribute to the impetus toward urban sprawl itself as well as to our driving patterns. More women in the workplace, the entrance of the baby boom generation into the workforce, income growth, increases in single occupancy vehicle commutes, decreases in the cost of vehicle use, the changing character of suburbs and exurbs, much of it made possible by the post-industrial economy no longer wed to a central business district, the importance of convenience and control of one's schedule, and other factors all play a role. For a fuller account, see Oren, *supra* note 34, at 160-174.

colleagues to vote for his more moderate set of Clean Air Act Amendments.[91] In 1979, Congress missed an opportunity to use its bail out of the then failing Chrysler Corporation as the occasion to impose conditions on Chrysler's use of public funds that would have made Chrysler a leader in developing alternatives to the ICE.

On the other hand, aggressive pursuit of tailpipe standards may have the effect of producing incentives for the introduction of alternative propulsion technologies into the personal automobile. The leader in this strategy has been the state of California, not the federal government. In 1990, California embarked on a plan to stimulate the production of a zero emissions vehicle. (ZEV).[92] Under the original formulation of its plan, automobile manufacturers were to generate sales of ZEVs on a gradually increasing scale that eventually would amount to ten percent of the new car sales market statewide by the year 2003.[93] In the years subsequent, California successively suspended the intermediate requirements of producing two to five percent ZEV sales in the years prior to 2003. On September 7, and 8, 2000, however, the California Air Resources Board considered a petition from industry to suspend the 2003 ten percent requirement altogether. Rather than agreeing, the "Board . . . resolved that the basic [ten percent] ZEV requirement be retained and implemented."[94] California's ZEV requirement is technology forcing with respect to alternatives to the ICE in the same way as the federal tailpipe standards have been technology-forcing with respect to the catalytic converter.

California's ten percent requirement can partially be met by the sale of cars satisfying a PZEV requirement.[95] Because total compliance cannot be achieved in this or any other manner except by actually selling a number of ZEVs, however, production and sale of some ZEVs will be necessary for manufacturers to comply with the mandate. With respect to stimulating changes from the ICE, this fact is a crucial feature of California's program, because although the PZEV requirements can be met by vehicles using ICEs or

91. Interview with Leon Billings (April 1, 2000).

92. For more details on California's entire regulatory approach, see Leslie Harrison Reed, Jr. *California Low-Emission Vehicle Program: Forcing Technology and Dealing Effectively with the Uncertainties*, 24 B.C. ENVTL. AFF. L. REV. 695 (1997); Llyod S. Dixon & Steven Garber, *California's Ozone Reduction Strategy for Light-Duty Vehicles Direct Costs, Direct Emission Effects, and Market Responses* (Rand Institute for Civil Justice, 1996), available on Westlaw, TP-All library, MR-695-ICJ; Ashley Morris Bale, *The Newest Frontier in Motor Vehicle Control: The Clean Fuel Vehicle*, 15 VA. ENVTL. L.J. 213 (1995).

93. *See* California Air Resources Board Fact Sheet, 02/23/01, *available at* http://www.arb.ca.gov (last visited May 1, 2001).

94. *Id.*

95. PZEVs are vehicles that satisfy Supra Ultra Low Emissions Vehicle (SULEV) emissions standards, have zero evaporative emissions, and come with a 150,000 mile warranty. California Air Resources Board, Executive Summary to the Staff Report of the 2000 Zero Emission Vehicle Biennial Review, *available at* http://www.arb.ca.gov (last visited Dec. 1, 2000).

hybrid ICE/electric motor systems, the ZEV requirements cannot. ZEVs must be vehicles powered by either batteries or fuel cells. Thus a real ZEV standard pushes the development of such alternative vehicles, and provides the best prospect we currently have to harness the innovation and entrepreneurial creativity that industry has always asserted as the justification for government to set the goals and then permit industry to meet them.

The current competition between battery-powered vehicles and those using fuel cells illustrates this entrepreneurial and competitive process. When the ZEV program was first introduced, the major focus of attention was the battery-powered auto. Improvements in battery capacity and weight sufficient to make electric cars widely attractive have proven illusive over the past decade, however. At this stage in their development, battery-powered vehicles are saddled with limited range, small size and burdensome recharge requirements that suggest they will never achieve major market penetration. Attention and expectations have recently begun to shift to the fuel cell, with some analysts now predicting that it is the fuel cell that will be the technology of choice in a transition to so-called sustainable mobility.[96]

It is not clear whether research on alternative vehicles can produce products acceptable to an appreciable portion of the automobile buying public. Nor is it clear whether California will be able to maintain its ZEV requirement only by the expedient of extending the compliance date. If it does extend the date, the history with the federal tailpipe standards should counsel caution in announcing the failure of the ZEV mandate on that account. The federal timetable was relaxed several times, but the goals originally set in 1970 were never abandoned, and they were eventually met and exceeded.[97] Earnest technology-forcing seems much more promising as a means to gain the progress that it needed here than does a policy that fails to include technology-forcing features.

III. CONCLUSION

Over the past three decades, auto air emissions regulations have achieved genuine and significant reductions in the production of health and environment harmful pollution from the on-the-road fleet of automobiles. These regulations have imposed substantial costs on industry and hence on the consuming public. We are better off to have had them in place. The pattern of our approach to regulation shows a clear tendency to shy away from strategies that would prove unpopular with the American public and toward those that were either affirmatively popular or else broadly acceptable to the public. That meant we

96. Presentation by Lee Lynd, Professor of Chemical and Biochemical Engineering, Dartmouth College, given at Duke University's Environmental Institutions Workshop (Mar. 21, 2001) (copies on file with the author).

97. *See* pages 36 to 37, above.

lost opportunities for more substantial gains, and our policies have certainly deviated from an ideal policy, whatever ideal policy one chooses. Under a recipe view of the between policy and politics, falling short of policy perfection is not a sufficient ground for condemning the policies that democratic institutions have promulgated.

As to whether or not regulation of auto air emissions might be called an environmental success story, the jury is still out. The political dynamics preventing sterner frequency reduction measures or the direct imposition of alternatives to the ICE promise to prevent use of such policy tools any time soon, and the diminishing prospects of further returns from fuel content and tailpipe emissions controls may soon be more than offset by the progress-canceling consequences of increased VMT. Achieving the ultimate reductions that are necessary for long-term success, therefore, seems heavily dependent upon technology-forcing strategies such as the California ZEV approach. Should those strategies succeed in turning the crucial corner toward market-acceptable alternative vehicles, history will record ours as a period of a successful transition to more sustainable mobility. In that case, the political success of the past thirty years in maintaining strong citizen support for some sort of on going pollution reduction efforts may well be considered an essential element of that success story. If so, the mix of policy and politics in the regulation of auto air emissions will prove to have been much more satisfactory than a reading of either the policy failure literature or the political failure literature would suggest.